

**What is claimed is:**

1. A water-based cyan ink for ink-jet printing, comprising pigment particles or water insoluble colored polymer particles,

wherein an ink-jet image is formed by jetting the water-based cyan ink on a porous ink-jet recording sheet with an ink-jet printer without being subjected to an post-treatment, and the ink-jet image has the following set of color coordinate values in a  $L^*a^*b^*$  color space when  $L^*$  is in a range of  $65 < L^* < 75$ :

(i)  $-20 < a^* < 20$ ; and

(ii)  $-20 < b^* < 20$ .

2. The water-based cyan ink of claim 1, wherein the pigment particles or the water insoluble colored polymer particles has a volume average particle diameter of 10 to 200 nm.

3. The water-based cyan ink of claim 1 further comprises a water-soluble polymer and secondary particles of the pigment particles or the water insoluble colored polymer particles satisfy Formula (1):

Formula (1)

$$10 X^{-0.7} < Y < 40 X^{-0.7}$$

wherein X is a volume average particle diameter; and

Y is a polydispersity index which is defined by the following formula:

$$Y = (D_{90} - D_{10}) / D_{50},$$

wherein  $D_{90}$ ,  $D_{50}$ , and  $D_{10}$  are respectively particle diameters at which an integral of a distribution function  $dG$  ( $dG = F(D) \times dD$ ) is equal to 90 volume%, 50 volume% and 10 volume% of the total volume of the secondary particles or the water insoluble colored polymer particles, wherein G is a volume of the particle, D is a diameter of the secondary particle and  $F(D)$  is a volume frequency function.

4. The water-based cyan ink of claim 1 further comprises a water-soluble polymer in an amount of not less than 2 times of weight of the pigment particles or the water insoluble colored polymer particles.

5. The water-based cyan ink of claim 1, wherein the water insoluble colored polymer particles are covered with a pigment or a dye on a surface of the particles.

6. The water-based cyan ink of claim 5, wherein a weight ratio of the polymer to the pigment is 0.6 : 1 to 10 : 1.

7. The water-based cyan ink of claim 5, wherein a weight ratio of the polymer to the dye is 0.4 : 1 to 10 : 1.

8. An ink set for ink-jet printing containing a water-based cyan ink which comprises pigment particles or water insoluble colored polymer particles,

wherein an ink-jet image is formed by jetting the ink set on a porous ink-jet recording sheet with an ink-jet printer without being subjected to an post-treatment, and the ink-jet image has the following set of color coordinate values in a  $L^*a^*b^*$  color space when  $L^*$  is in a range of  $50 < L^* < 90$ :

(i)  $-20 < a^* < 20$ ; and

(ii)  $-20 < b^* < 20$ .

9. An ink set for ink-jet printing containing the water-based cyan ink of claim 3.

10. A method for producing an ink-jet image using the water-based cyan ink of claim 3.

11. A method for producing an ink-jet image using the ink set of claim 8.